

ATTACHMENT 2-5 IG FACILITY DESCRIPTION

1.0 INTRODUCTION

1.01 This attachment describes Igloo G for the permit application as required by R315-3-2.5 and R315-8-2.9. This attachment is organized in the following sections:

- Facility description
- Topographic map and general requirements
- Facility location information
- Traffic information
- References

2.0 FACILITY DESCRIPTION

2.0.1 The facility description is divided into the following sections:

- General description
- Address and owner/operator
- Facility operations
- Hazardous waste management operations
- Hazardous waste facility siting criteria

2.1 General Description: R315-3-2.5, R315-8-2.9

- 2.1.1 Dugway Proving Ground (DPG) is a subordinate command of the U.S. Army Test and Evaluation Command. DPG's primary mission is to perform testing on chemical warfare and defense systems and flame, incendiary, and smoke obscurant systems. DPG is the only testing facility in the U.S. equipped to perform these tasks on the scale necessary to ensure that items have been thoroughly developed and tested under realistic conditions.
- 2.1.2 DPG is located in a remote area of central Utah (see Figure 5-1). DPG is approximately 67 miles southwest of Salt Lake City. DPG lies within Tooele County and occupies an area approximately 52 miles long and 35 miles wide. The tract is situated in the southwest corner of the Great Salt Lake Desert and extends into parts of Dugway and Skull Valleys.
- 2.1.3 The installation covers approximately 840,911 acres and includes mountains, valleys, and a large, flat sparsely vegetated area that extends westward into the southern reaches of the barren salt flats of the Great Salt Lake Desert. Most of this land is unimproved, with 300 acres of improved land and 536 acres of semi-improved land, mostly in English Village.
- 2.1.4 The terrain is mainly flat or gently sloping with intermittent sand dunes and small hills. The Cedar Mountain Range extends from English Village northwesterly forming the northeast boundary of the reservation. Little Granite Mountain, Camels Back Ridge, Wig Mountain, and Granite Mountain divide the installation into several minor areas.

2.2 Address and Owner/Operator

2.2.1 The address of DPG is as follows:

U.S. Army Dugway Proving Ground
Dugway Proving Ground
Dugway, UT 84022

Operator: Commander, U.S. Army Dugway Proving Ground
Facility Contact: Director, Directorate of Environmental Programs (DEP)

2.3 Facility Operations

2.3.1 This section describes DPG's operations in Section 2.3.1 and potential modifications to hazardous waste management practices not defined in the permit in Section 2.3.2.

2.4 DPG Facility Operations

2.4.1 DPG began operation in 1942 when testing of military weapons commenced. DPG was activated in order to meet the need of the Chemical Warfare Service for expanded testing facilities. The site was selected because of its seclusion, low population density, and scarcity of wildlife.

2.4.2 DPG can be divided into three major activity areas: (1) the housing, administrative, and National Guard Maneuver Areas (including English Village and Fries Park); (2) the Avery and Ditto Technical Centers and Carr Facility; and (3) Baker Facility, the test grids, and buffer areas south and west of Ditto Technical Center (see Figure 5-2). The Post Headquarters and the Chemical Laboratory Division are at the Ditto Technical Center, the Life Sciences Division is at Baker, and the Weapons Branch of the Test Support Division is at the Carr Facility.

2.4.3 In the course of its research and testing operations, as well as routine functions, DPG generates various hazardous wastes, which may be stored on-site or transported to an off-site treatment, storage or disposal facility through the Defense Reutilization and Marketing Office or private contractor.

2.4.4 Igloo G (Building 3643) is a 30-year old ammunition storage magazine structurally designed to contain fires involving explosives and munitions. It is used for storage of range-recovered munitions (RRMs), which are known or suspected to contain chemical warfare materiel (CWM). Igloo G is located in the eastern portion of DPG at the Carr Facility (see Figure 5-3). A map of the Igloo G storage facility is shown in Table 5-4.

2.4.5 The testing of munitions involves test-firing projectiles on various ranges located in the western part of DPG. The primary data obtained during test firing are velocity, pressure, trajectory, rate of descent, and impact functioning or malfunctioning information. One of the main advantages of DPG ranges is that test items impacting in the soft soil are recoverable with minimal damage. Since 1968, the test firings have been conducted using blank or mock-up projectiles to simulate actual conditions. Prior to 1968, test firings were conducted with rounds containing CWM.

2.4.6 Occasionally, projectiles did not explode on impact; these projectiles are called duds. Many of the duds were retrieved shortly after the test firing. However, some of the duds were buried in the soft soil upon impact. A natural process called frost jacking or frost heaving occasionally brings

the dud to the surface over a period of time. On average, less than five duds are discovered on an annual basis. The duds are collected during periodic range clearing operations and are called Range Recovered Munitions (RRMs).

- 2.4.7 RRM, which are known to contain chemical agent, are classified as P999, a State of Utah listed hazardous waste. An RRM may also be classified as D003 reactive hazardous waste due to the presence of explosive charges (fuze and/or burster) if they were not removed at the time of recovery. Additional waste codes may also apply to RRM because of the specific chemical composition of the materials they contain. An example of additional waste codes is a single RRM that has been tentatively identified as containing Lewisite, which means that in addition to the P999 hazardous waste code the D004 code (arsenic-bearing waste) also applies. Each RRM will be individually characterized using the waste analysis plan outlined in the Igloo G Attachment 2-1 of this permit. Although DPG uses state-of-the-art waste analysis procedures, the potential exists that additional waste codes may need to be associated with an RRM if future state-of-the-art procedures are developed. Attachment 2-1 of this permit provides additional details of the hazardous waste in storage, and the methods used to determine waste code designations for each RRM.

2.5 Potential Modifications to Hazardous Waste Management Practices Not Defined in the Igloo G Permit

- 2.5.1 Igloo G is an existing structure. Potential modifications to current waste management practices include future Munitions Management Device operations to remove agent from each RRM, which is determined to contain chemical agent, and final treatment and disposal for each component of the RRM. These operations are still in the planning and development stages.

2.6 Hazardous Waste Management Operations

- 2.6.1 DPG stores containerized RRM, which are classified as hazardous waste, in Igloo G. Igloo G is located at the Carr Facility (see Figure 5-3), which is 11.5 miles west of English Village.
- 2.6.2 The Explosive Ordnance Disposal (EOD) entity is responsible for range clearing operations, which generate the RRM. The EOD personnel also overpack RRM in the field and transport the RRM to Igloo G.
- 2.6.3 The facility manager is responsible for operations in Igloo G, as well as compliance with all hazardous waste storage requirements. RRM are brought to Igloo G and released to the facility manager. Available information concerning the type of munition, type of chemical agent present (or suspected to be present), and the type of explosive component present is recorded for each RRM. The RRM is then packaged in secondary containers for storage and placed in Igloo G in accordance with Army regulations. Once the RRM are placed in Igloo G, the overpacked RRM generally are not opened and are moved as little as possible.
- 2.6.4 The waste and product material within Igloo G are physically inspected on a quarterly or more frequent basis. Refer to Attachment 2-3 in this permit for details. First entry monitoring is conducted to ensure safe access to the igloo.
- 2.6.5 Once access to the igloo is permitted, based on first entry monitoring, appropriate First Entry Team personnel conduct an inventory of the RRM in Igloo G to verify that the quantity, location and labeling of the waste in storage matches the records.

2.6.6 Inspection of the condition of waste containers is conducted by trained personnel. Each inspection includes specialized sampling of the air within the igloo to determine whether a leak of chemical agent has occurred as required by Attachment 2-1 and specified by Attachment 2-11. The inspectors conduct a detailed leak survey and visual inspection of individual waste containers to determine their condition. Waste containers found to be in poor conditions are placed in overpack containers. See Attachment 2-3 of this permit for additional information on inspections.

2.7 Hazardous Waster Facility Siting Criteria: Non-Applicable

2.8 Parks, Monuments, Recreation Areas, Wilderness, Wild and Scenic Rivers: Non-Applicable

2.9 Ecologically and Scientifically Significant Natural Areas: Non-Applicable

2.10 100-Year Floodplains: Non-Applicable

2.11 Holocene Faults: Non-Applicable

2.12 Underground Mines, Salt Domes, and Salt Beds: Non-Applicable

2.13 Dam Failure Flood Areas: Non-Applicable

2.14 Landslide, Mudflow, or Other Earth Impact Areas: Non-Applicable

2.15 Farmlands: Non-Applicable

2.16 Areas Above Aquifers: Non-Applicable

2.17 Recharge Zones: Non Applicable

2.18 Drinking Water Source Protection Areas: Non-Applicable

2.19 Dwellings, Residential Areas, Incompatible Structures: Non-Applicable

2.20 Surface Waters: Non-Applicable

2.21 Archaeological Sites: Non-Applicable

2.22 Other Applicable Regulations: Non-Applicable

2.23 Emergency Response and Transportation Safety: Non-Applicable

2.24 Availability and Adequacy of Emergency Services: Non-Applicable

2.25 Trained Emergency Response Personnel and Equipment: Non-Applicable

3.0 TOPOGRAPHIC MAP AND GENERAL REQUIREMENTS: R315-3-2.5(b)(19)

3.01 A topographic map of the central portion of DPG showing the location of Igloo G is presented in this permit in Exhibit 2-1. An area map, which includes the area within 1,000 feet of Igloo G, is

presented in Exhibit 2-2. The 100-year floodplain has never been defined at DPG by the Federal Emergency Management Agency and, therefore, was not defined on the maps. However, it is unlikely that Igloo G will be affected by a 100-year flood since there has been no historical flooding of the Igloo G area by Government Creek, the nearest surface water source. This creek is an intermittent stream located approximately 2 miles southwest of the storage site. Also, the nearest tributary to Government Creek, which is located approximately 1 mile southwest of the storage site, is not anticipated to cause flooding at Igloo G. The topographic map in this permit in Exhibit 2-2 of this permit indicates the area within 1,000 feet of Igloo G.

- 3.0.2 Igloo G is located in the Carr Facility, 11.5 miles west of English Village. Igloo G is a storage area for RRM's. A wind rose for DPG is presented in Figure 5-5. The data for the wind rose was collected at DPG's Ditto area weather station. The dominant direction of light winds, primarily of local origin, is southeasterly at night and northwesterly during the day. The winds over the DPG vicinity are strongly influenced by local topographic conditions. These local influences are not noticeable when strong winds, the result of large-scale weather storm patterns, are prevalent. The winds near the mountains usually have very different local effects and do not necessarily reflect the general local pattern.
- 3.0.3 Figure 5-6 identifies ownership of the major tracts of land in the vicinity of DPG. This figure does not identify the small tracts of state and privately owned land scattered throughout that area, which are under the jurisdiction of the Bureau of Land Management. All land within a radius of approximately 3 miles of Igloo G is located within DPG boundaries. The land use within 1,000 feet of Igloo G is limited to storage of munitions within igloos similar to Igloo G. There are no dwellings, offices or laboratories located within 1,000 feet of Igloo G. Access to the Igloo G compound is strictly controlled. Land use surrounding DPG is predominantly farming/grazing.

4.0 FACILITY LOCATION INFORMATION: R315-3-5(6)(11)

- 4.0.1 Compliance with facility location standards is discussed in the following sections:

- Seismic Standard
- Floodplain Standard

4.1 Seismic Standard: R315-3-5(b)(11)(I) and (ii), 8-2.9(a)

- 4.1.1 Although Utah is tectonically active, most of the earthquake activity occurs about 55 miles to the east along the Wasatch Range foothills. The U.S. Geological Survey has conducted a study (USGS, 1988) to determine the distribution, relative age, and amount and extent of surface rupture on Quaternary fault scarps in the Tooele 1° x 2° Quadrangle in northwestern Utah. The conclusions of the study state that morphologic and geologic data collected along the fault scarps in the area indicate that all were formed during the late Pleistocene era with no clear evidence of Holocene surface faulting. Several faults inferred based on geophysical evidence are located on DPG; however, there is no evidence of displacement during Holocene time.
- 4.1.2 Figures 5-7 display the geographical data from a regional gravity survey conducted in the Camels Back Ridge Area. These data indicate potential subsurface faulting. No evidence of these inferred faults exists at the surface in the area of the Ditto Technical Center and Carr Facility. Igloo G is more than 200 feet from these inferred faults, which do not exhibit evidence of displacement in Holocene time.

4.2 Floodplain Standard: R315-3-2.5(b)(11)(iii)-(iv); 8-2.9(b)

- 4.2.1 A National Flood Insurance Rate Map, identifying the boundary of the 100-year flood, has not been prepared for DPG. There are no permanent streams or other surface water bodies on DPG. Surface water from precipitation flows through well-established drainage channels into the flat plain and evaporates. Like other arid regions, DPG is subject to flash flooding following high-precipitation events. Flash floods have occurred only four times in the history of the installation, in 1944, 1952, 1973, and 1983. The major area affected during flash floods has been the Government Creek drainage channel, which has overflowed and caused minor inundation of roads at Ditto Technical Center. The historic flash flood map in Exhibit 1-3 of this permit illustrates the area known to have flooded along Government Creek at the Ditto Technical Center. The culvert at Stark Road restricts the flow in the Government Creek channel during periods of high flow, thus causing the area south of the road to flood. The flooding is not near Igloo G.
- 4.2.2 Igloo G is located in an upland area approximately 5 feet above and about 1 mile northeast of the nearest tributary to Government Creek and 16 feet above and about 2 miles northeast of Government Creek. Because of this location, it is not likely that a 100-year flood would affect the igloo.

5.0 TRAFFIC INFORMATION: R315-3-2.5(b)(10)

- 5.0.1 Two hard-surfaced roads and one improved gravel road service DPG. Utah State Road 199 connects DPG (via Johnson Pass) with Utah State Route 36 east of Clover. County Road B-15 connects DPG (via Skull Valley) with U.S. Interstate 80 at Timpie Junction. An improved gravel road connects DPG (via Lookout Pass) with Utah State Route 36 near Vernon. Only the road over Johnson Pass goes through towns and villages. The remaining major hard-surface roads in the vicinity are Utah State Route 73 in Rush Valley and Alternate U.S. Route 50 in Nevada.
- 5.0.2 Within DPG there are approximately 693 miles of road; about 371 miles of which are regularly maintained. By type the maintained roadways are classified as follows:

High-grade bituminous pavement	74 miles
Low-grade bituminous pavement	138 miles
Gravel	145 miles
Natural soil	<u>14 miles</u>
Total	371 miles

- 5.0.3 Roads within the grids and operation areas are, for the most part, single or double bituminous surface treatments. All roads leading to and within the developed areas are bituminous surfaced. Roadways within DPG that are relevant to operations at Igloo G are discussed below.

- English Village: Stark Road, which runs through the southern part of the area, provides Access to and through English Village. Stark Road, to this point, is a primary road, 24 feet wide with 3-foot shoulders, and is in good condition. All primary streets in English Village are 24 feet wide, and are in good condition.
- Ditto Technical Center: Stark Road, which is a 24-foot wide road with 3-foot shoulders and is in good condition, provides Access. Primary roads within this area are asphaltic concrete 30 feet wide, in good condition. Secondary roads are gravel, are 18 feet, 15 feet, and 30 feet wide respectively, and are in good condition. Stark Road, servicing the western portions of

the installation, is asphaltic concrete, 20 feet wide with 2-foot shoulders. The road to Michael Army Airfield is asphaltic concrete, 18 feet wide, in fair condition. Parking lots and the motor pool area are asphaltic concrete, in good condition. One parking lot and the area south of the motor pool are gravel, in good condition.

- R.W. Grid: The access road to R.W. Grid from Ditto Technical Center is 16 feet wide, gravel, and in good condition.
- Carr Facility: Durand Road provides Access, which is 18 feet wide with no shoulders. This road is in good condition. Primary roads within this area are medium bituminous type, 24 feet wide, in fair condition. Secondary roads are 10-foot-wide gravel-surfaced roads.
- Outer Areas: Burns Road and Highway 101 provide by Stark Road, which is the primary access road, and Access to the active grid areas and ranges. The latter is highway in name only. Numerous secondary roads provide for grid operations.

- 5.04 The most concentrated vehicle traffic on DPG is in English Village. Traffic volumes at DPG include receiving and shipping trucks, which travel primarily to and from the central receiving area, the warehouse area, the ammunition storage area, the fuel area, and the technical areas. Exhibit 1-4 (6 plates) of this permit presents traffic control maps.
- 5.0.5 Transport records for 1988 show an average of 1.92 receiving trucks and 1.73 shipping trucks per day, carrying an average load of 13.46 and 3.02 tons per day, respectively (MTCTEA, 1989). Information demonstrating the load-bearing capacity of the on-site roads used to transport hazardous waste is not available. Their roads were constructed using U.S. Army Corps of Engineers standards. No structural failure of these roads has occurred, even under heavy truck traffic, including semi-trucks, as well as an occasional Army tank. DPG has ongoing programs to maintain these roads.
- 5.06 All RRM's transported by EOD personnel to Igloo G are transported according to internal operating procedures. There are no plans to move the RRM's stored in Igloo G outside the facility boundary.

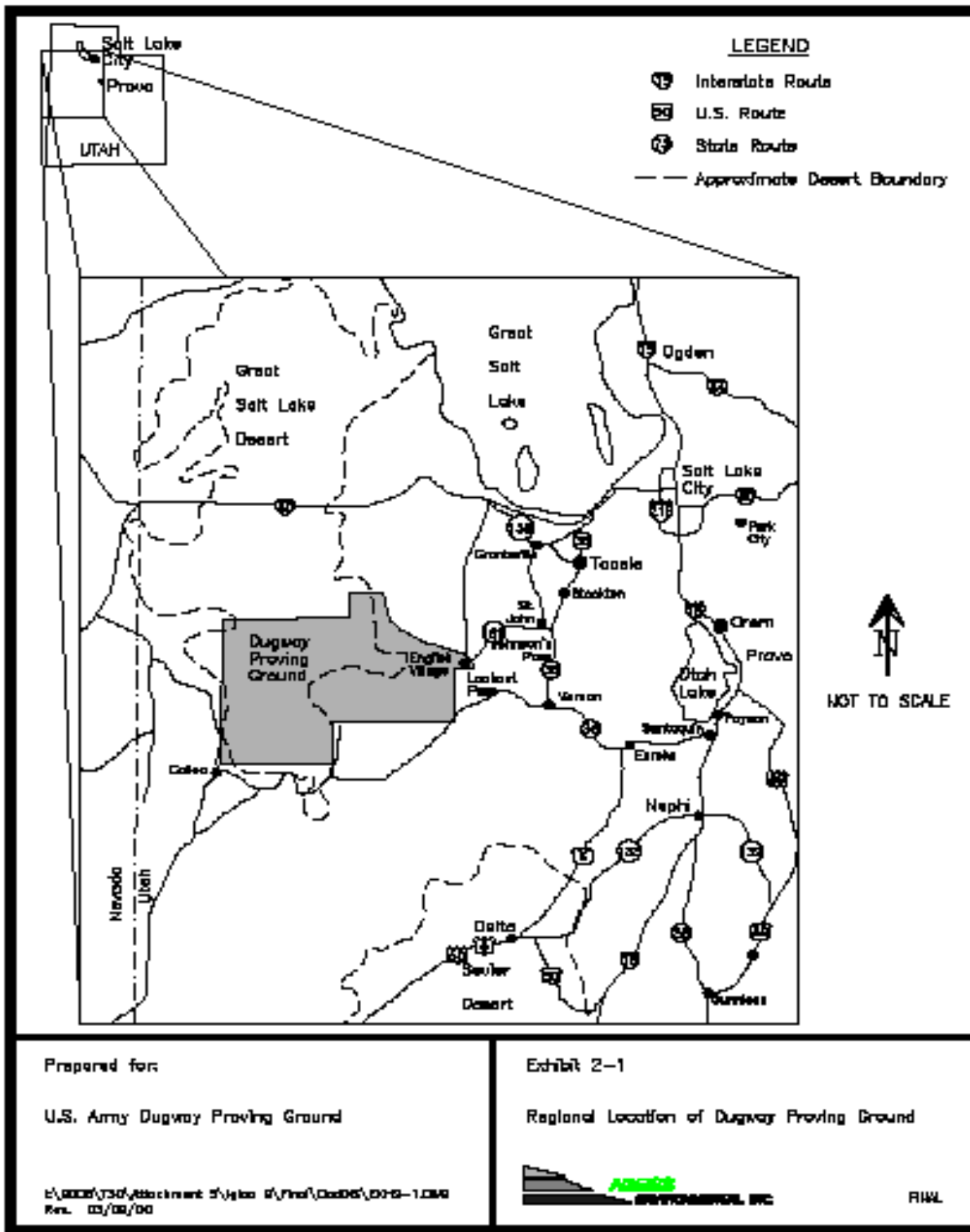


Figure 5-1 Regional Location of Dugway Proving Ground.

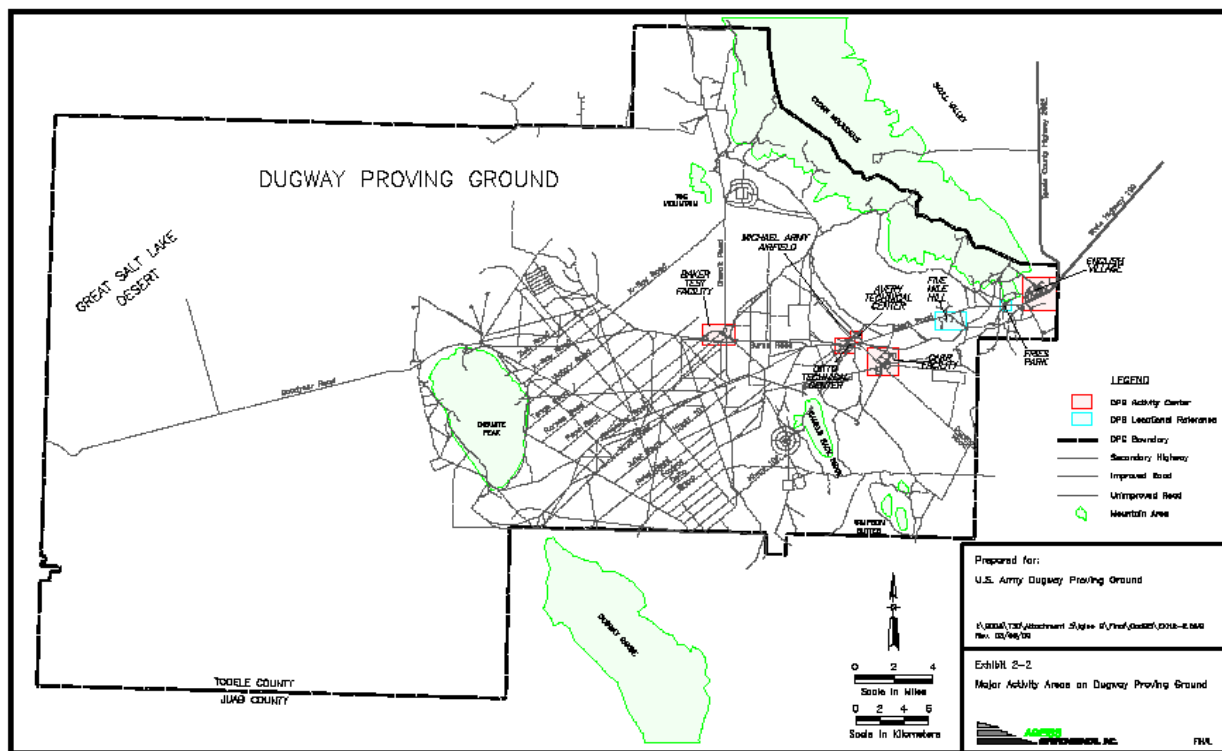


Figure 5-2 Major Activity Areas on Dugway Proving Ground.

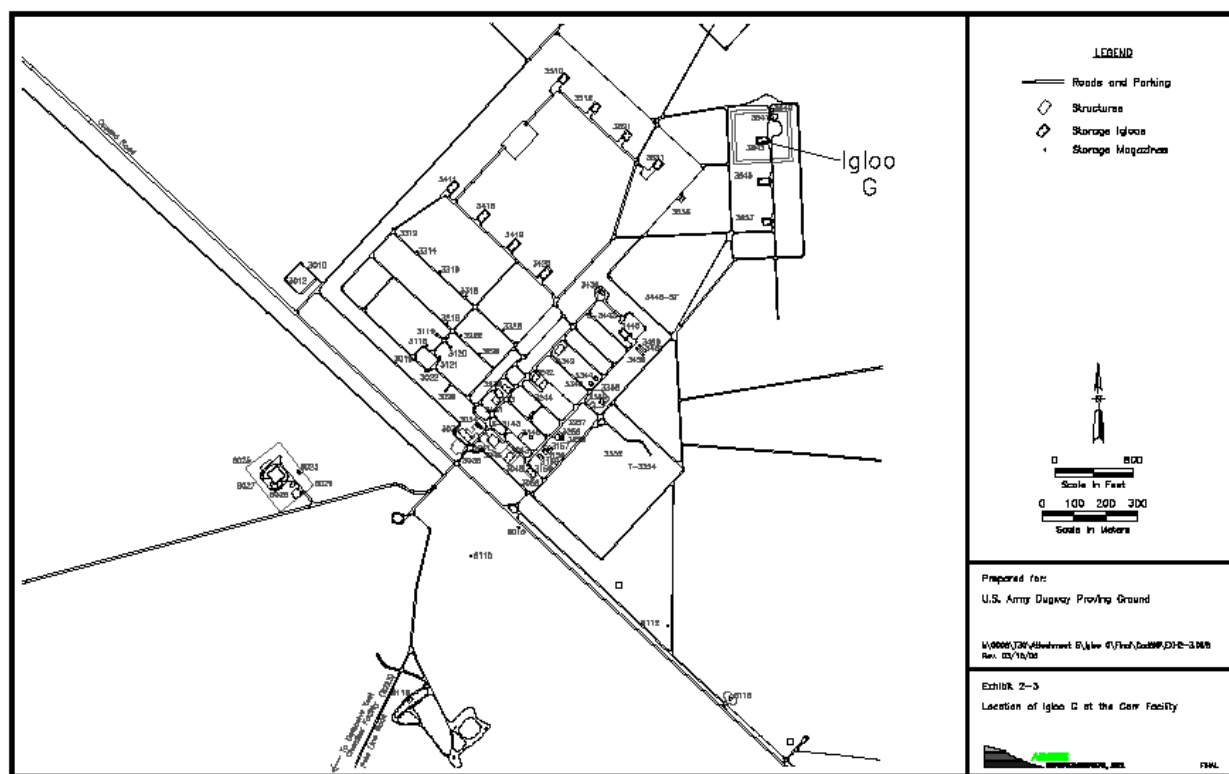


Figure 5-3 Location of Igloo G at the Carr Facility.

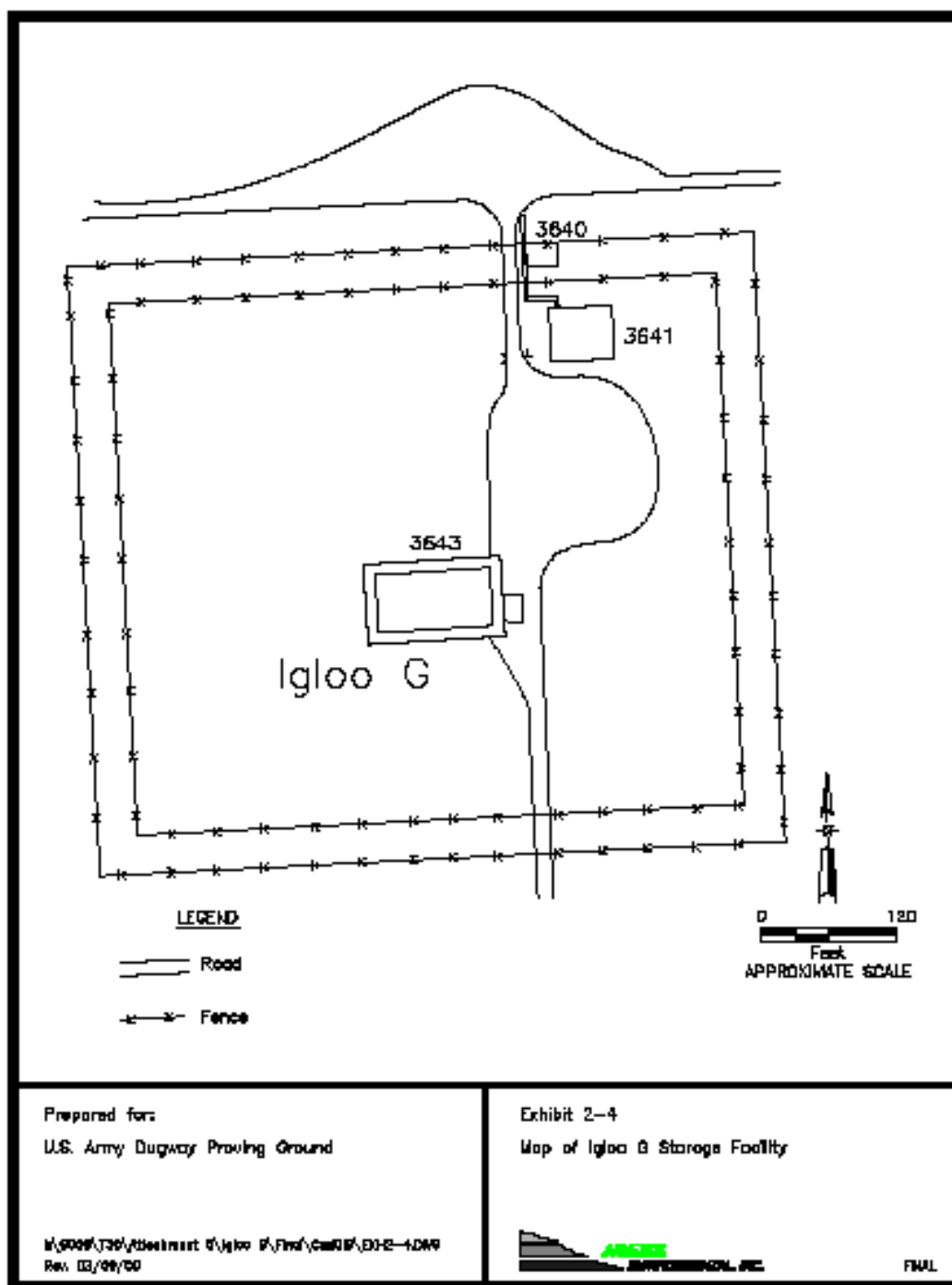
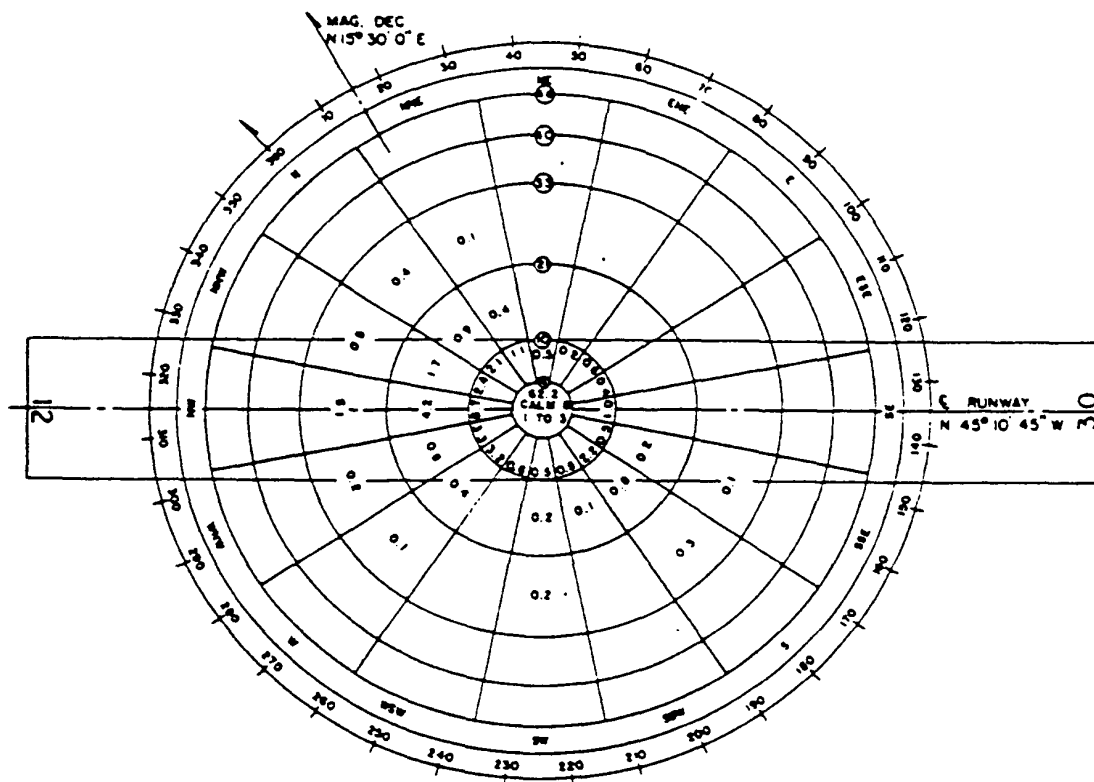


Figure 5-4. Map of Igloo G Storage Facility



SURFACE WIND ROSE

Maximum percentage of wind coverage, based on a 13 mph crosswind component: 96.6%

Total Observations

Period of Record: 1943 - 1945 & 1949 - 1967

Where Observed: Ditto Weather Station

Scale: 0.1 = 2 mph Not to scale

Note:

Wind percentages do not total 100% due to machine run data in which all figures are rounded to nearest 0.1% causing some fractional parts to be dropped.

Average daily temperature during hottest month 94° F or 34.3° C.

VELOCITY	GROUPS
0 - 3 MPH	62.2%
4 - 10 MPH	24.7%
11 - 21 MPH	9.8%
22 - 33 MPH	3.3%
34 - 40 MPH	0.0%

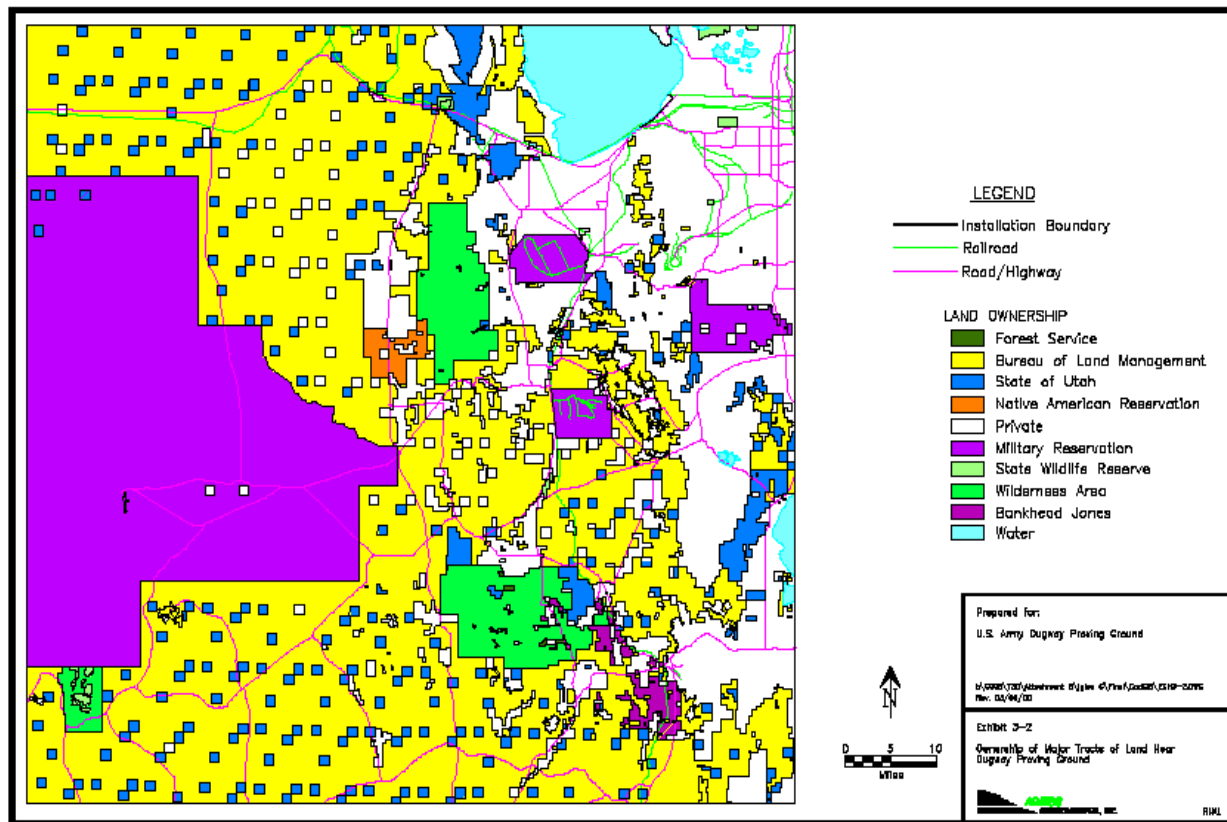


Table 5-6 Ownership of Major Tracts of Land Near Dugway Proving Ground

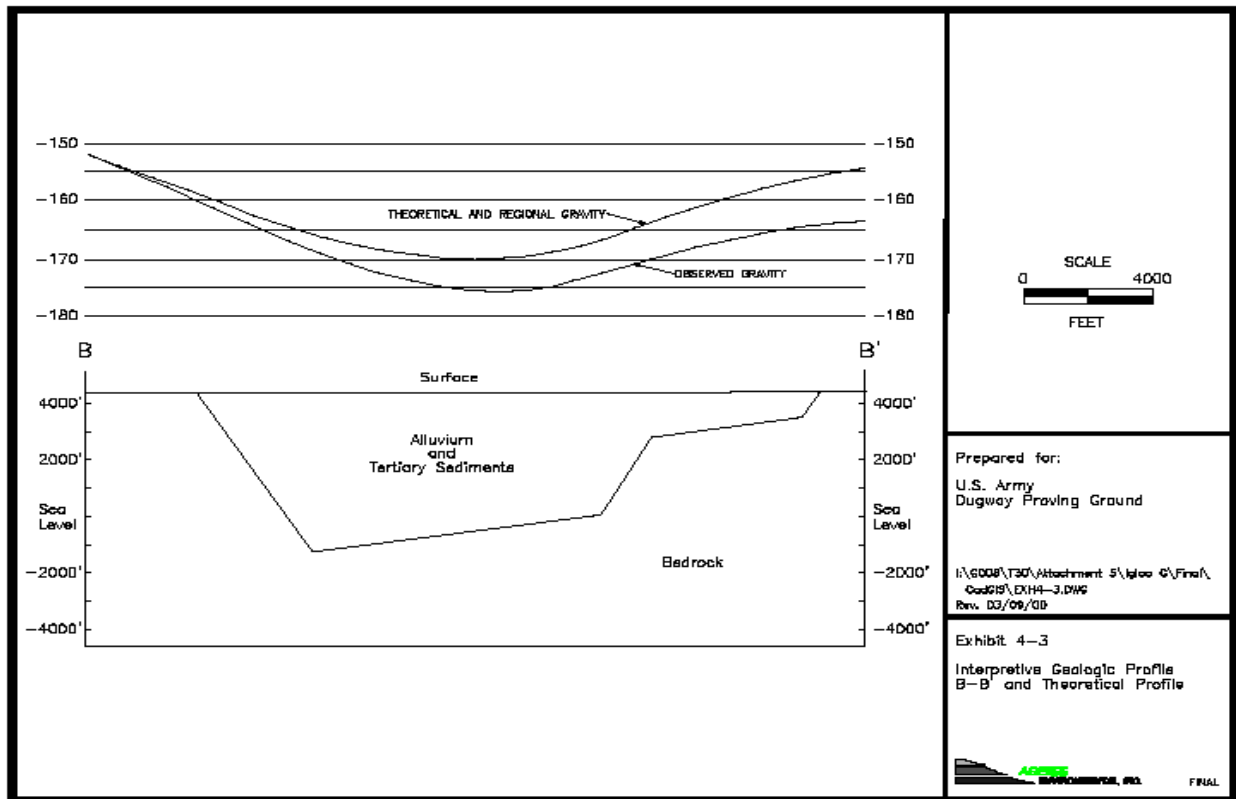


Figure 5-7 Interpretive Geologic Profile B-B' and Theoretical Profile (Assumed Density Contrast is 0.4)